

CLAIMS

- 1 A load restraint system for securing an elongated load hold-down member in secured, tensioned relation, including a winch having a drum rotatably mounted in a frame and securing said hold down member; torque-applying first capstan means for rotating the drum within the frame to wind-on and apply load-securing tension to the hold-down member; ratchet means to prevent over-hauling of the drum by the tensioned hold-down member, and spring-loaded tensioning means removably secured to said first capstan means in pre-tensioned relation, to drive the drum in tension increasing relation with the hold-down member, wherein said spring-loaded tensioning means extends in supported relation by said frame, whereby in use, upon diminishment of the load-securing tension in the hold-down member, the spring-loaded tensioning means operates to rotate the winch drum, to thereby maintain tension in the hold-down member.
2. The load restraint system as set forth in Claim 1, said spring-loaded tensioning means including coupling means selectively connecting said spring-loaded tensioning means with said rotatable drum, in torque transferring relation therewith.
- 3 The load restraint system as set forth in Claim 2, said spring-loaded tensioning means including a torsion spring, a rotatable driving head connected thereto, and torque-applying means for selectively applying torque to said torsion spring.
4. The load restraint system as set forth in Claim 3, said coupling means including a ratchet wheel and a selectively operable ratchet pawl.
5. The load restraint system as set forth in Claim 4, wherein said ratchet pawl is activated automatically upon actuation of said driving head by rotation thereof in tensioning said spring to a predetermined load torque.

6. The load restraint system as set forth in Claim 1, wherein said spring is mounted upon a barrel carried on a capstan portion of said winch, and by said winch frame; said barrel having a ratchet pawl to enable connection of said spring in predetermined tensioned condition to said winch drum.
7. The load restraint system as set forth in Claim 1, said spring-loaded tensioning means being mounted over said first capstan means in pinned, torque transfer relation therewith.
8. The load restraint system as set forth in Claim 1, said ratchet means having twin ratchet wheels in side by side relation with respective ratchet teeth of said wheels in mutually off-set relation; and a ratchet pawl in engaging with each said ratchet wheel.
9. The load restraint system as set forth in Claim 1, said ratchet means including at least one toothed ratchet wheel, and at least one ratchet pawl in locking contact with tooth portions of said wheel; and a ratchet spring mounted in load applying relation with said pawl, urging said pawl into engagement with said teeth.
10. The load restraint system as set forth in Claim 1, including clip means attached to said winch in movement inhibiting relation with said ratchet means
11. The load restraint system as set forth in Claim 1, said winch ratchet means including at least one toothed ratchet wheel and at least one ratchet pawl in locking relation with said ratchet wheel; and clip means attached to said winch in movement controlling relation with said ratchet pawl, having a first selected position to retain said pawl in locked engagement with said ratchet wheel, and having a second selected position to retain said pawl in withdrawn, non-contacting relation with said ratchet wheel.
12. The load restraint system as set forth in Claim 8, said ratchet wheels each having six teeth; the teeth of one said ratchet wheel being off-set by thirty degrees from the teeth of

the other said ratchet wheel.

13. The load restraint system as set forth in Claim 1, said spring-loaded tensioning means including a second capstan means directly coupled to said first capstan means.

14. The load restraint system as set forth in Claim 6, said spring loaded tensioning means including a second capstan means, a ratchet wheel secured thereto, and ratchet pawl means suspended in disengaged relation with said ratchet wheel when said spring loaded tensioning means is unloaded, and moving into engaging, load transfer relation with said ratchet wheel upon the application of a predetermined torsional loading to the spring loaded tensioning means.

15. A spring-loaded torque transfer mechanism, for attachment in pinned relation to a first capstan portion of a load restraint winch having a drum rotatably mounted within a frame, said transfer mechanism including a mounting cylinder for attachment in telescoping relation with said winch frame and said capstan portion; shear pin means for insertion in coupling relation between said winch capstan portion and said mounting cylinder; a torsion spring mounted upon supporting sleeve means, positioned coaxially with said mounting cylinder, and rotatable thereabout; second capstan means including a ratchet wheel, secured to said mounting cylinder; said supporting sleeve means including a ratchet pawl pivotally suspended therefrom in axially aligned relation with said ratchet wheel, said spring support sleeve means including torque-bar receiving third capstan means whereby, in use said torque bar may be inserted in said second capstan means and rotated in a first direction, to tighten said load winch against a load restraint strap, and said torque bar may be repositioned to engage said third capstan means, to rotate said sleeve means and said spring in a tensioning direction opposite said first direction, and to

enable said ratchet pawl to pivot into engaging relation with said ratchet wheel, to automatically couple said spring in torsioned driving, load take-up relation with said winch and said load restraint strap.

16. The spring-loaded torsion transfer mechanism as set forth in Claim 15. said mechanism mounting cylinder extending about said winch first capstan portion and projecting through an adjacent portion of said frame; said torsion spring supporting sleeve means being rotatably supported on the mounting cylinder.

17. The spring-loaded torsion transfer mechanism as set forth in Claim 15. said mechanism mounting cylinder extending within said winch first capstan portion; said torsion spring supporting sleeve means being at least partially supported on said winch first capstan portion.